WATER QUALITY GUIDELINES FOR NON-TARGET ANALYTES

May 2007

This spreadsheet calculates the concentations of non-target petroleum compounds in water which result in a hazard quotient of 1 based on ingestion &, for volatile fractions, inhalation.

Non-Carcinogenic Risk Formula (EPA, December 1991):

Cw = [(THI*BW*AT*CF)/(ED*EF*((RAFw*IRw/RfDo)+(VF*IRa/RfDi)))]

C5-C8 ALIPHATICS	
Parameters	**Values**
Cw (Water concentration - µg/L)	848
THI (Target hazard index - unitless)	1
BW (Body weight - kg; (EPAIX, October 2004))	70
AT (Averaging time - day (EPAIX, October 2004))	10950
CF (Conversion factor - µg/mg)	1000
ED (Exposure duration - yr (EPAIX, October 2004))	30
EF (Exposure frequency - day/yr (EPAIX, October 2004))	365
RAFw (Chemical specific water relative absorption factor - unitless; MADEP, October 2002)	1
IRw (Ingestion rate - L/day; (EPAIX, October 2004))	2
RfDo (Oral reference dose - mg/kg/day (MADEP, November 2003))	0.04
VF (Volatilization factor - L/m^3 (EPAIX, October 2004)	0.5
IRa (Inhalation rate - m^3/day; TWA (EPA, August 1997)	13
RfDi (Inhalation reference dose - mg/kg/day (IRIS, January 2007 - n-hexane))	0.200

C9-C12 ALIPHATICS	
Parameters	**Values**
Cw (Water concentration - µg/L)	522
THI (Target hazard index - unitless)	1
BW (Body weight - kg: (EPAIX, October 2004))	70
AT (Averaging time - day (EPAIX, October 2004))	10950
CF (Conversion factor - µg/mg)	1000
ED (Exposure duration - yr (EPAIX, October 2004))	30
EF (Exposure frequency - day/yr (EPAIX, October 2004))	365
RAFw (Chemical specific water relative absorption factor - unitless; MADEP, October 2002)	1
IRw (Ingestion rate - L/day; (EPAIX, October 2004))	2
RfDo (Oral reference dose - mg/kg/day (MADEP, November 2003))	0.10
VF (Volatilization factor - L/m^3 (EPAIX, October 2004))	0.5
IRa (Inhalation rate - m^3/day; TWA (EPA, August 1997)	13
RfDi (Inhalation reference dose - mg/kg/day (MADEP, November 2003))	0.057

C9-C18 ALIPHATICS	
Parameters	**Values**
Cw (Water concentration - µg/L)	522
THI (Target hazard index - unitless)	1
BW (Body weight - kg; (EPAIX, October 2004))	70
AT (Averaging time - day (EPAIX, October 2004))	10950
CF (Conversion factor - µg/mg)	1000
ED (Exposure duration - yr (EPAIX, October 2004))	30
EF (Exposure frequency - day/yr (EPAIX, October 2004))	365
RAFw (Chemical specific water relative absorption factor - unitless; MADEP, October 2002)	1
IRw (Ingestion rate - L/day; (EPAIX, October 2004))	2
RfDo (Oral reference dose - mg/kg/day (MADEP, November 2003))	0.10
VF (Volatilization factor - L/m^3 (EPAIX, October 2004))	0.5
IRa (Inhalation rate - m^3/day; TWA (EPA, August 1997)	13
RfDi (Inhalation reference dose - mg/kg/day (MADEP, November 2003))	0.057

C9-C10 AROMATICS	
Parameters	**Values**
Cw (Water concentration - µg/L)	~~1,154~~
Beneficial use ceiling (µg/L)	1,000
THI (Target hazard index - unitless)	1
BW (Body weight - kg; (EPAIX, October 2004))	70
AT (Averaging time - day (EPAIX, October 2004))	10950
CF (Conversion factor - µg/mg)	1000
ED (Exposure duration - yr (EPAIX, October 2004))	30
EF (Exposure frequency - day/yr (EPAIX, October 2004))	365
RAFw (Chemical specific water relative absorption factor - unitless; MADEP, October 2002)	0.91
IRw (Ingestion rate - L/day; (EPAIX, October 2004))	2
RfDo (Oral reference dose - mg/kg/day (MADEP, November 2003))	0.03

C11-C22 AROMATICS	
Parameters	**Values**
Cw (Water concentration - µg/L)	~~1,154~~
Beneficial use ceiling (µg/L)	1,000
THI (Target hazard index - unitless)	1
BW (Body weight - kg; (EPAIX, October 2004))	70
AT (Averaging time - day (EPAIX, October 2004))	10950
CF (Conversion factor - µg/mg)	1000
ED (Exposure duration - yr (EPAIX, October 2004))	30
EF (Exposure frequency - day/yr (EPAIX, October 2004))	365
RAFw (Chemical specific water relative absorption factor - unitless; MADEP, November 2003)	0.91
IRw (Ingestion rate - L/day; (EPAIX, October 2004))	2
RfDo (Oral reference dose - mg/kg/day (MADEP, October 2002))	0.03

C19-C36 ALIPHATICS	
Parameters	**Values**
Cw (Water concentration - µg/L)	~~70,000~~
Beneficial use ceiling (µg/L)	1,000
THI (Target hazard index - unitless)	1
BW (Body weight - kg; (EPAIX, October 2004))	70
AT (Averaging time - day (EPAIX, October 2004))	10950
CF (Conversion factor - µg/mg)	1000
ED (Exposure duration - yr (EPAIX, October 2004))	30
EF (Exposure frequency - day/yr (EPAIX, October 2004))	365
RAFw (Chemical specific water relative absorption factor - unitless; MADEP, October 2002)	1
IRw (Ingestion rate - L/day; (EPAIX, October 2004))	2
RfDo (Oral reference dose - mg/kg/day (MADEP, November 2003))	2

EPA, December 1991; Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part B)
EPAIX, October 2004; EPA Region 9 Preliminary Remediation Goals
EPA, August 1997; Exposure Factors Handbook Volumes I & III
IRIS, January 2007 - n-hexane; Integrated Risk Information System updated inhalation reference dose for the surrogate n-hexane.
MADEP, October 2002; Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach
MADEP, November 2003; Updated Petroleum Hydrocarbon Fraction Toxicity Values for the VPH/EPH/APH Methodology